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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Paper No. 20040617

Application Number: 10/091,502  
Filing Date: March 07, 2002  
Appellant(s): CHE ET AL.

**MAILED**  
JUN 26 2004  
**GROUP 1700**

Oblon, Spivak, McClelland, Maier & Neustadt, P.C.  
For Appellant

**EXAMINER'S ANSWER**

**MAILED**  
JUN 26 2004  
**GROUP 1700**

This is in response to the appeal brief filed 03/05/2004.

**(1) *Real Party in Interest***

A statement identifying the real party in interest is contained in the brief.

**(2) *Related Appeals and Interferences***

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

**(3) *Status of Claims***

The statement of the status of the claims contained in the brief is correct.

**(4) *Status of Amendments After Final***

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) *Summary of Invention***

The summary of invention contained in the brief is correct.

**(6) *Issues***

The appellant's statement of the issues in the brief is correct.

**(7) *Grouping of Claims***

Appellant's brief includes a statement that the claims do stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8). (Refer to VI. Issues and VII. Grouping of the Claims)

**(8) *Claims Appealed***

The copy of the appealed claims contained in the Appendix to the brief is correct.

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**(9) Prior Art of Record**

6399251	Honbo et al	06-2002
6558846	Tsushima et al	05-2003
6294292	Tsushima et al	09-2001
JP 2000-090972	Kuruma et al	03-2000

**(10) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

This rejection is set forth in prior Office Actions.

***Claim Rejections – 35 USC 103***

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 1-2, 5-8, 11-12 and 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese publication JP 2000-090972 in view of Honbo et al 6399251.

The instant application is directed to a secondary power source wherein the disclosed inventive concept comprises the specific negative electrode density. Other limitations include the specific carbon material and its characteristics; the binder; the specific surface area; and the solvent and lithium salt.

With respect to claims 1 and 11:

The JP'972 publication discloses a secondary power source having a positive electrode including the activated carbon, a negative electrode including a carbon material for storing and releasing lithium ion (*that is, capable of doping and undoping lithium ions*), and the organic

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electrolyte containing the lithium salt (ABSTRACT). It is disclosed that the secondary power source is a lithium rechargeable battery (SECTION 0005).

It is disclosed that the weight ratio of the carbon material and binder is from 70:30 - 96:4 (SECTION 0031). Thus, the negative electrode contains from 4-30 weight % of a binder.

Example 1 shows a negative electrode comprising a weight ratio of 9:1 of carbon material to binder (SECTION 0035). Thus, the negative electrode contains 10 weight % of the binder. Thus, the negative electrode is made of carbon material and this specific amount of binder.

It is also disclosed that amount of conducting material in the positive electrode ranges from 0.1-20 % (SECTION 0023); and the binder content in the positive electrode also ranges from 1-20 % (SECTION 0024). Thus, the positive electrode is made of activated carbon material and these specific amount of binder and conducting agent.

With respect to claims 2, 12:

It is disclosed that the carbon material has a lattice spacing of [002] of 0.335-0.410 nm according to X-ray diffraction (SECTION 0025).

With respect to claims 5 and 15:

It is disclosed that the weight ratio of the carbon material and binder is from 70:30 - 96:4 (SECTION 0031). Thus, the negative electrode contains from 4-30 weight % of a binder.

Example 1 shows a negative electrode comprising a weight ratio of 9:1 of carbon material to binder (SECTION 0035). Thus, the negative electrode contains 10 weight % of the binder.

With respect to claims 6 and 16:

It is disclosed the use polyvinylidene fluoride as a binder (SECTION 0027).

With respect to claim 7:

It is disclosed that the activated carbon contained in the positive electrode has a specific surface area of 800-3000 m<sup>2</sup>/g.

With respect to claim 8:

It is disclosed that the solvent of the organic electrolyte contains propylene carbonate (ABSTRACT); ethylene carbonate, butylene carbonate, dimethyl carbonate, ethyl methyl carbonate, diethyl carbonate, sulfolane, dimethoxyethane (SECTION 0010). The lithium salt maybe LiPF<sub>6</sub>, LiBF<sub>4</sub>, LiClO<sub>4</sub>, LiN(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>, CF<sub>3</sub>SO<sub>3</sub>Li, LiC(SO<sub>2</sub>CF<sub>3</sub>)<sub>3</sub>, LiAsF<sub>6</sub> and LiSbF<sub>6</sub> (SECTION 0032).

The JP'972 publication discloses a secondary power source according to the foregoing. However, the JP'972 publication does not expressly disclose the specific negative electrode density.

Honbo et al disclose a lithium secondary battery wherein the negative electrode active material is characterized in containing carbon, and its negative electrode density is in the range larger than 0.95 g/cm<sup>3</sup>, and smaller than 1.5 g/cm<sup>3</sup> (COL 3, lines 57-61).

In view of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to make the negative electrode of the JP'972 publication by having the specific negative electrode density of Honbo et al as Honbo et al teach that if the negative electrode density is smaller than 0.95 g/cm<sup>3</sup>, vacancies in the negative electrode are numerous and the specific surface area as the electrode is large. Accordingly, a large amount of positive electrode material is precipitated on the surface and inside of the negative electrode. The precipitated positive electrode material decreases the capacity of the negative electrode significantly, and makes the cycle life short. If the negative electrode density is larger than 1.5

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g/cm<sup>3</sup>, the vacancy in the negative electrode is too small to make the electrolyte penetrate into the inside of the electrode. Therefore, the capacity of the negative electrode is decreased significantly, and the objective lithium secondary battery for mounting on power sources can not be obtained. Hence, those of ordinary skill in the art would obviously envision that the claimed negative electrode density is within the disclosed range, and therefore, an electrode having the claimed negative electrode density would exhibit the same desirable characteristics.

3. Claims 3-4, 9-10 and 13-14 rejected under 35 U.S.C. 103(a) as being unpatentable over the Japanese publication JP 2000-090972 in view of Honbo et al 6399251 as applied to claims 1 and 11 above, and further in view of Nishimura et al 6103373.

The JP'972 publication and Honbo et al are applied, argued and incorporated herein for the reasons above.

As to claims 3-4 and 13-14:

Additionally, the JP'972 publication does disclose that a vapor-growth carbon fiber maybe used as the carbon material (SECTION 0005). It is disclosed that the graphite system carbon material has a desirable lattice spacing of [002] of 0.335-0.338 nm (SECTION 0025). **EXAMPLE 6** shows a negative electrode wherein the graphite system has a lattice spacing of [002] of 0.337 nm (EXAMPLE 6).

As for claims 9 and 10:

The JP'972 publication discloses that the weight ratio of the carbon material and binder is from 70:30 - 96:4 (SECTION 0031). Thus, the negative electrode contains from 4-30 weight % of a binder. Example 1 shows a negative electrode comprising a weight ratio of 9:1 of carbon

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material to binder (SECTION 0035). Thus, the negative electrode contains 10 weight % of the *binder*. It is disclosed the use polyvinylidene fluoride as a binder (SECTION 0027).

However, the foregoing prior art does not expressly disclose the specific amount of carbon fibers in the negative electrode as recited in claims 3 and 13; the specific lattice distance as recited in claims 4 and 14 (which depends from claims 3 and 13) and specific binder amount and material as recited in claims 9-10 (which depends from claim 3).

With respect to claims 3-4 and 13-14:

Nishimura et al disclose carbon fiber materials used as an electrode material for making electrodes in secondary batteries (ABSTRACT) wherein the electrode material is suitable for making negative electrodes (COL 5, lines 56-59). It is further disclosed that the amount of fiber material, comprised mainly of VGCF (*vapor grown carbon fiber*) to be added is between 0.15-30 w/o weight percent (COL 10, lines 45-55); the mixing ratio of the agglomerate should be between 5-20 w/o of the total weight of the electrode mixture (COL 11, lines 55-60). It is further disclosed that the material has a plane spacing (d0002) of less than 0.34 nm (COL 10, line 65- COL 11, line 3).

With respect to claims 9-10:

Nishimura et al discloses in EMBODIMENTS 4-6 that the binder content is either 7 wt. % or 10 wt. % (COL 14, lines 11-14, lines 30-33 & lines 48-51). It is also disclosed that the binder is a fluororesin (COL 11, lines 25-27).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to make the negative electrode of both the JP'972 publication and Honbo et al by containing the specific amount of carbon fibers in the negative electrode as Nishimura et al

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disclose that when the amount of addition exceeds 30 weight %, the volume of the carbon fiber is too high and the amount of the electrode active ingredient is reduced, the effect becomes reversed and the charge storage capacity begins to drop. When the amount is less than 0.1 weight %, the effect of providing increased contact points to the particles is lessened so that the electrical resistance cannot be lowered, resulting in not producing improvement in the charge storage capacity. Hence, those of ordinary skill in the art would obviously envision that the claimed negative amount of carbon fibers in the negative electrode is within the disclosed range, and therefore, an electrode having the claimed amount of carbon fibers would exhibit the same desirable characteristics.

As to the specific lattice distance, it would have been obvious to one skilled in the art at the time the invention was made to make the carbon fibers of both the JP'972 publication and Honbo et al by having the specific lattice distance as Nishimura et al teach that a carbon fiber material having a plane spacing ( $d_{0002}$ ) of less than 0.34 nm is preferred because it provides a graphite material with a layer structure to enable the lithium ions to be intercalated. Accordingly, since Nishimura et al teach preferred lattice distances lower than 0.34 nm to provide a graphite material enabling intercalation of lithium ions, Nishimura et al directly teaches the use of a lattice distance within the claimed range (*See MPEP 2144.05 Obviousness of Ranges*). Furthermore, Nishimura et al's teaching is consistent with the disclosure of the JP'972 publication wherein is stated that a lattice spacing of 0.335-.338 nm is desirable for reducing resistance.

As to the specific binder amount and material, it would have been obvious to one skilled in the art at the time the invention was made to make the negative electrode of both the JP'972



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publication and Honbo et al by containing the specific binder amount as Nishimura et al teach that binders act as bonding agent for the negative material mixture. In that, since Nishimura et al teach examples using the specific binder amount, those of ordinary skill will recognize that by using the claimed binder amount in the electrode material, the binder itself will meet its intended functionality as a bonding agent. Thus, the prior art directly teaches the use of a binder within the claimed range (*See MPEP 2144.05 Obviousness of Ranges*). Furthermore, Nishimura et al's teaching is consistent with the disclosure of the JP'972 publication wherein is stated that the amount of binder in the negative electrode ranges from 4-30 weight %, and if more than 30 wt. % is used, the electrode capacity is reduced as well as if less than 4 wt. % is used, the binding characteristic weakens producing ablation between the negative electrode and the current collector. Regarding the binder material, it would be obvious to use the claimed binder material in the negative electrode of both the JP'972 publication and Honbo et al as Nishimura et al disclose that fluororesins serve as a bonding agent for negative electrode mixture; additionally, Nishimura et al's teaching is consistent with the disclosure of the JP'972 publication showing that a fluororesin such as polyvinylidene fluoride provides suitable binding properties to be employed in negative electrode.

#### ***Double Patenting***

4. The text of those sections of Double Patenting not included in this action can be found in a prior Office action.

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5. Claims 11-12 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3, 7 and 15 of U.S. Patent No. 6294292 in view of Honbo et al 6399251.

The U.S. Patent No. 6294292 claims the following (claims 1, 3, 7 and 15):

1. A secondary power source, which comprises  
a positive electrode containing activated carbon, 20  
a negative electrode containing a carbon material capable  
of doping and undoping lithium ions, and  
an organic electrolyte containing a lithium salt, wherein  
a ratio of the positive electrode capacity ( $C^+$ ) to the 25  
negative electrode capacity ( $C^-$ ), i.e.  $C^+/C^-$ , is from 0.1  
to 1.2,  
the positive electrode has a thickness of from 100 to 200  
 $\mu\text{m}$ , and  
the negative electrode has a thickness of from 10 to 50 30  
 $\mu\text{m}$ .

3. The secondary power source according to claim 1,  
wherein the carbon material has a lattice spacing of [002]  
face of from 0.335 to 0.410 nm. 40

7. The secondary power source according to claim 1,  
wherein the activated carbon of the positive electrode has a  
specific surface area of from 800 to 3,000  $\text{m}^2/\text{g}$ .

30 15. A secondary power source, which comprises  
a positive electrode containing activated carbon,  
a negative electrode containing a carbon material capable  
of doping and undoping lithium ions, and  
35 an organic electrolyte containing a lithium salt, wherein  
a ratio of the positive electrode capacity ( $C^+$ ) to the  
negative electrode capacity ( $C^-$ ), i.e.  $C^+/C^-$ , is from 0.1  
to 1.2, and  
the positive electrode contains a lithium transition metal  
40 oxide in an amount of from 0.1 to 20 wt %.

The US'292 patent claims a secondary power according to the above-mentioned aspects.

However, the US'292 patent does not expressly claim the specific negative electrode density.

Honbo et al disclose a lithium secondary battery wherein the negative electrode active material is characterized in containing carbon, and its negative electrode density is in the range larger than  $0.95 \text{ g/cm}^3$ , and smaller than  $1.5 \text{ g/cm}^3$  (COL 3, lines 57-61).

In view of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to make the negative electrode of the US'292 patent by having the specific negative electrode density of Honbo et al as Honbo et al teach that if the negative electrode density is smaller than  $0.95 \text{ g/cm}^3$ , vacancies in the negative electrode are numerous and the specific surface area as the electrode is large. Accordingly, a large amount of positive electrode material is precipitated on the surface and inside of the negative electrode. The precipitated positive electrode material decreases the capacity of the negative electrode significantly, and makes the cycle life short. If the negative electrode density is larger than  $1.5 \text{ g/cm}^3$ , the vacancy in the negative electrode is too small to make the electrolyte penetrate into the inside of the electrode. Therefore, the capacity of the negative electrode is decreased significantly, and the objective lithium secondary battery for mounting on power sources can not be obtained. Hence, those of ordinary skill in the art would obviously envision that the claimed negative electrode density is within the disclosed range, and therefore, an electrode having the claimed negative electrode density would exhibit the same desirable characteristics.

6. Claims 11-12 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 3, 5 and 7-8 of U.S. Patent No. 6558846 in view of Honbo et al 6399251.

The U.S. Patent No. 6558846 claims the following (claims 1, 3, 5 and 7-8):

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1. A secondary power source, which comprises a positive  
electrode comprising activated carbon and a lithium-  
containing transition metal oxide, a negative electrode com-  
prising a carbon material capable of doping and undoping  
lithium ions, and an organic electrolyte comprising a lithium  
salt, wherein the lithium-containing transition metal oxide is  
an oxide of lithium and at least one element selected from  
the group consisting of Mn, Fe, Co, Ni, Zn, and W, and the  
lithium-containing transition metal oxide is present in the  
positive electrode in an amount of from 0.1 to 15 wt %.

3. The secondary power source according to claim 1,  
wherein the activated carbon of the positive electrode has a  
specific surface area of from 800 to 3,000 m<sup>2</sup>/g.

5. The secondary power source according to claim 1,  
wherein the carbon material of the negative electrode has a  
spacing of [002] face of from 0.335 to 0.410 nm.

7. The secondary power source according to claim 1,  
wherein the organic electrolyte comprises at least one sol-  
vent selected from the group consisting of ethylene  
carbonate, propylene carbonate, butylene carbonate, dim-  
ethyl carbonate, ethylmethyl carbonate, diethyl carbonate,  
sulfolane and dimethoxyethane.

8. The secondary power source according to claim 1,  
wherein the lithium salt is at least one member selected from  
the group consisting of LiPF<sub>6</sub>, LiBF<sub>4</sub>, LiClO<sub>4</sub>,  
LiN(SO<sub>2</sub>CF<sub>3</sub>)<sub>2</sub>, CF<sub>3</sub>SO<sub>3</sub>Li, LiC(SO<sub>2</sub>CF<sub>3</sub>)<sub>3</sub>, LiAsF<sub>6</sub> and  
LiSbF<sub>6</sub>.

The US'846 patent claims a secondary power according to the above-mentioned aspects.  
However, the US'846 patent does not expressly claim the specific negative electrode density.

Honbo et al disclose a lithium secondary battery wherein the negative electrode active  
material is characterized in containing carbon, and its negative electrode density is in the range  
larger than 0.95 g/cm<sup>3</sup>, and smaller than 1.5 g/cm<sup>3</sup> (COL 3, lines 57-61).

In view of these disclosures, it would have been obvious to one skilled in the art at the  
time the invention was made to make the negative electrode of the US'846 patent by having the  
specific negative electrode density of Honbo et al as Honbo et al teach that if the negative  
electrode density is smaller than 0.95 g/cm<sup>3</sup>, vacancies in the negative electrode are numerous

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and the specific surface area as the electrode is large. Accordingly, a large amount of positive electrode material is precipitated on the surface and inside of the negative electrode. The precipitated positive electrode material decreases the capacity of the negative electrode significantly, and makes the cycle life short. If the negative electrode density is larger than 1.5 g/cm<sup>3</sup>, the vacancy in the negative electrode is too small to make the electrolyte penetrate into the inside of the electrode. Therefore, the capacity of the negative electrode is decreased significantly, and the objective lithium secondary battery for mounting on power sources can not be obtained. Hence, those of ordinary skill in the art would obviously envision that the claimed negative electrode density is within the disclosed range, and therefore, an electrode having the claimed negative electrode density would exhibit the same desirable characteristics.

It is also noted that the combination of claims 7-8 of the US'846 patent as a single claim (as recited in claim 8 of the instant application 10/091502) represents an obvious variation resulting by combining single claims of the issued US'846 patent.

**(11) Response to Argument**

Applicant's arguments have been carefully and meticulously reviewed, and fully and entirely considered but they are not persuasive in overcoming the rejection. In this respect, the Response to Argument is presented hereinafter in an alternative format for the convenience of the Applicants (Appellants) and to avoid, whatsoever, any further allegation which is or might be indicative that the Examiner's Answer fails to, in fact, answer applicants' (Appellants') arguments. Thus, even though the examiner's position has been set forth in detail in the original Response to Argument of the Examiner's Answer dated 03/24/04, it is substantially repeated here for purposes of clarity. In order to facilitate applicants' (Appellants') understanding of the

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response provided by the Examiner, the Examiner is currently addressing applicants'

(Appellants') arguments page-by-page and paragraph-by-paragraph.

All of the above stated, the Examiner respectfully presents the following:

1) Applicants' comments presented from page 3, line 17 to page 6, line 16 of the Appeal Brief are considered to describe the general background of applicants' invention and the applied prior art.

2) The Applicants have argued the following from page 6, line 17 to page 7, line 8 of the Appeal Brief:

*"The Examiner relies on Honbo et al as describing a lithium secondary battery with a negative electrode of a carbon material having a density in the range of 0.95-1.5 g/cm<sup>3</sup>. However, the positive electrode material of Honbo et al is a "complex oxide containing Li and Mn, which has a spinel type crystalline structure" (column 2, lines 38-40). Honbo et al discloses that the density range of 0.95-1.5 g/cm of the negative electrode material prevents the precipitation of Mn (dissolved from the positive electrode material) on and inside the negative electrode (column 4, lines 5-17). Thus, Honbo et al discloses that the density range of the negative electrode material of Honbo et al should be selected to minimize a failure mode which is specific to the Li/Mn oxide composition of the positive electrode material of Honbo et al.*

*However, the claimed secondary power source has a completely different kind of positive electrode material (i.e. activated carbon) which cannot fail in the manner described in Honbo et al (activated carbon does not contain the Mn ions which Honbo et al discloses can precipitate in the negative electrode material). Consequently, the specific failure mode described in Honbo et al is not possible in the claimed secondary power source or, for that matter, in the secondary power sources of Kuruma et al, or the claims of the Tsushima et al patents. Thus, one of ordinary skill in the art of preparing secondary power sources would not reasonably consider the disclosure of Honbo et al to apply to the secondary power source*

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*of Kuruma et al, or the claims of the Tsushima et al patents, in which the positive electrode material comprises activated carbon. Accordingly, Honbo et al does not reasonably suggest combining an activated carbon positive electrode with a carbon material negative electrode having a density in the claimed range.”*

In response to applicant's argument that “Honbo teaches that specific density range of negative electrode material prevents the precipitation of Mn” or “Honbo teaches that the specific density range of negative electrode material is specific to the Li/Mn oxide composition of the positive electrode” or “the positive electrode material of Honbo et al is a "complex oxide containing Li and Mn, which has a spinel type crystalline structure” or “the claimed secondary power source has a completely different kind of positive electrode material (i.e. activated carbon) which cannot fail in the manner described in Honbo et al”, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). In this regard, it is noted that Honbo et al teach a negative electrode active material characterized in containing carbon, and having a density in the range larger than 0.95 g/cc, and smaller than 1.5 g/cc. Thus, Honbo et al's teaching does clearly encompass the use of the negative electrode materials made of carbon and having the claimed density range regardless of the battery chemistry per se. Hence, Honbo et al directly teaches the use of carbon negative active material within the specified density magnitude.

Furthermore, regarding applicant's argument that there is no suggestion to combine the references (i.e. the positive electrode material of Honbo et al is a "complex oxide containing Li and Mn, which has a spinel type crystalline structure” or “the claimed secondary power source

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has a completely different kind of positive electrode material (i.e. activated carbon) which cannot fail in the manner described in Honbo et al”), the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the disclosures of both references are found to be within the same field of endeavor and, thus, relevant and pertinent to each other because the battery environment disclosed in both references is comparable, namely, both reference are directed to batteries or electrochemical cells having organic electrolyte systems and address the same problem of providing working battery components such as the negative electrode suitable for incorporation into batteries or electrochemical cell embodiments. Furthermore, the examiner wishes to point out that the electrode of the prior art performs exactly the identical function specified in the instant claim in substantially the same way, and produces the substantially the same results as the claimed electrode of the present invention. Consequently, a person of ordinary skill in the art would have recognized the interchangeability of the element (i.e. the negative electrode) shown in the prior art for the corresponding element claimed in the instant invention. Since there are insubstantial differences between the negative electrode of the prior art and the claimed negative electrode, and the Honbo et al reference does not provide any indication that its negative electrode is specially restricted to any particular battery environment as argued and speculated by the applicants, the burden is shifted to the applicant to provide objective evidence demonstrating that Honbo’s negative electrode when used as applied in the



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battery of Kuruma et al will indeed cause detrimental effects thereto. That is to say, the burden is shifted to the applicants to supply, provide or present objective evidence showing why Honbo et al's negative electrode cannot function in a substantially similar battery environment.

3) The Applicants have also argued the following from page 7, line 9 to page 7, line 14 of the Appeal Brief:

*"As described above, none of the other applied references describes the density of the negative electrode material, and therefore fail to recognize that the negative electrode density is result-effective in a secondary power source having an activated carbon positive electrode material and a carbon material negative electrode material. Accordingly, the combination of Honbo et al and the remaining applied references also fails to suggest the claimed secondary power source."*

With respect to applicant's argument that the density of the negative electrode is a result-effective variable, the examiner likes to contend that as set forth in MPEP 2144.05 Obviousness of Ranges, II. Optimization of Ranges, B. Only Result-Effective Variables Can Be Optimized: a particular parameter must first be recognized as a result-effective variable in the prior art, i.e. a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. In this case, applicant's argument basically agrees with the fact the negative electrode density should not be considered a result-effective variable at all. For example, applicants argued that: a) "in effect, applicants discovered that the density of the negative electrode is a result-effective variable that affects both the initial capacity and the change in capacity" (see page 3, lines 5-7 of the Request for Reconsideration After Final; in addition, refer to section 4 of this Examiner's Answer for further details regarding the unexpected results or criticality of the claimed range); b) "as

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described above, none of the other applied references describe the density of the negative electrode material, and therefore fail to recognize that the negative electrode density is result-effective in a secondary power source” (see page 5, lines 13-18 of the Request for Reconsideration After Final). Thus, since applicants share the same opinion that the prior art failed to recognize the negative electrode density is a result-effective variable, it is therefore noted that the negative electrode density does not impart criticality in the secondary power source and, hence it is not supportive of patentable subject matter.

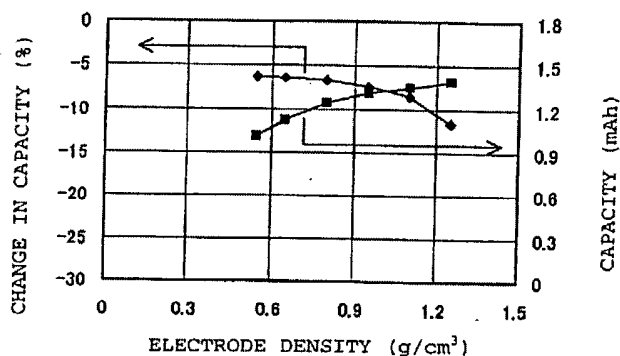
4) The Applicants have further argued the following from page 7, line 15 to page 9, line 10 of the Appeal Brief:

*“Furthermore, Table 1 at page 17 of the present specification demonstrates the criticality of the claimed density range of the negative electrode. Example 6 is a secondary power source which is otherwise identical to that of Example 1, except that the negative electrode density is 0.55 g/cm<sup>3</sup>, and Example 7 is a secondary power source otherwise identical to that of Example 1, except that the density of the negative electrode is 1.25 g/cm<sup>3</sup>. In other word, the secondary power source of Example 6 has a negative electrode density somewhat lower than that of the claimed range, and the secondary power source of Example 7 has a negative electrode density somewhat higher than that of the claimed range. The secondary power source of Example 6 has a significantly lower initial capacity than that of Example 1, and the secondary power source of Example 7 has a significantly greater reduction in capacity after 2000 cycles, compared to Example 1. Thus, the claimed secondary power source has superior performance characteristics compared to otherwise identical secondary power sources having a negative electrode density outside the claimed range. Accordingly, none of the applied references, either individually or in combination, suggest the claimed secondary power source.*

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The above-discussed data is graphically shown in Fig. 1 of the specification, reproduced below:

FIG. 1



In response to the above arguments, the Examiner finds in the Final Rejection that "the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985)."

In reply, *Obiaya* is inapposite, because the prior art does not suggest the present invention. *Honbo et al* is an example of a lithium ion secondary cell, discussed above and described in the specification herein at page 5, lines 6-19, which operates according to a different mechanism from that of the secondary power source of, for example, *Kuruma et al*, the claims of the *Tsushima et al* patents, and the present invention. Indeed, the lithium secondary battery of *Honbo et al* is irrelevant with regard to secondary power sources of the specific construction herein, and of *Kuruma et al* and the claims of the *Tsushima et al* patents. Nor do Appellants agree that *Honbo et al* is even within the inventor's field of endeavor, which field does not include lithium ion secondary cells in which the positive electrode is composed mainly of a lithium-containing transition metal oxide."

As far as criticality of the claimed density range and/or the superior performance characteristics of the secondary power sources presented in Table 1 (Examples 1-7), the examiner likes to contend that such results and, thus, the specific power sources as prepared in

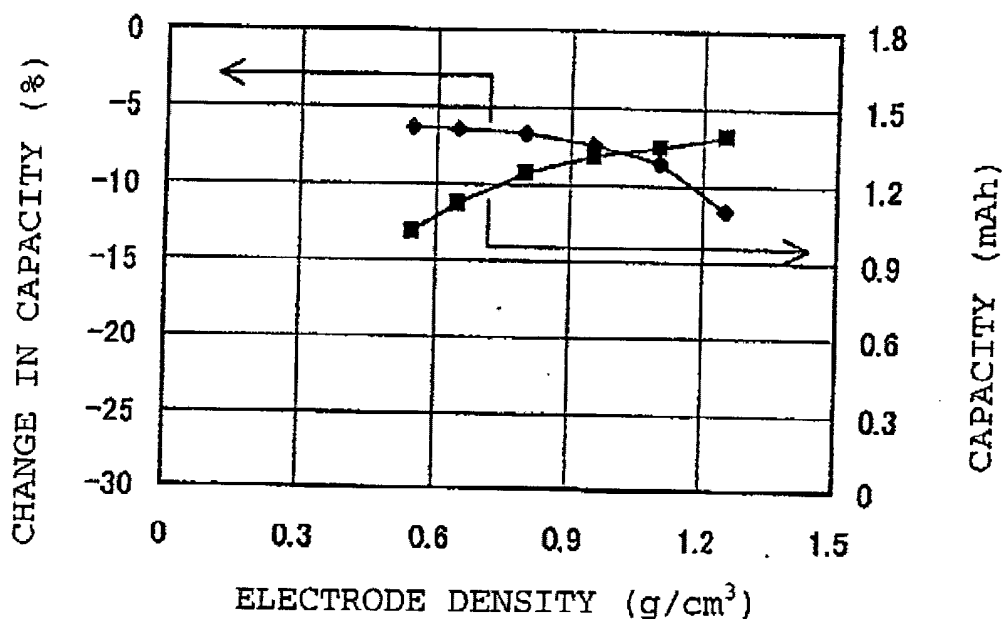
EXAMPLES 1-7 are not commensurate to the specific secondary power source as claimed in claims 1-16. In this respect, it is emphasized that the instant (claimed) secondary power source lacks significant, essential, vital and/or crucial features, for instance, the specific binder material, the specific conducting agent material, the specific current collector and its material, the specific electrolyte comprising both the salt and the solvent and the specific mass ratio of every single power source component as presented in EXAMPLES 1-7. Thus, the foregoing performance characteristics of the exemplified secondary power sources does not reflect or correspond to the performance characteristic of the claimed power source. In this regard, it is further contended that the submission of objective evidence of patentability does not automatically mandate a conclusion of patentability in and of itself. Although the record may establish evidence of secondary considerations which might be indicia of nonobviousness, the actual record establishes such a strong case of obviousness that the objective evidence of nonobviousness is not sufficient to outweigh the evidence of obviousness. Accordingly, a prima facie case of obviousness cannot be simply rebutted by merely recognizing additional advantages or latent properties present in the prior art. Moreover, applicants must further show that the results were greater than those which would have been expected from the prior art to an unobvious extent, and that the results are of a significant and practical advantage. For example, it is noted that applicants have fairly argued that the specific negative electrode density somehow affects the capacity (its initial capacity and cycle capacity) of the power source (see page 5, last full paragraph and page 6, bridging paragraph and Figure 1 of the Request for Reconsideration After Final). However, it is further noted that Honbo et al clearly teach that if the negative electrode density is smaller than 0.95 g/cc, vacancies in the negative electrode are numerous and the specific surface area of the

electrode is large, accordingly, a large amount of positive active material is precipitated on and inside the negative electrode and thus, the precipitated material decreases the capacity of the negative electrode significantly, and makes the cycle life short. On the other hand, if the negative electrode density is larger than 1.5 g/cc, the vacancies is too small to make electrolyte penetrate into the inside of the electrode, and therefore, the capacity of the negative electrode is decreased significantly, and the objective secondary lithium battery can not be obtained (Honbo et al US 6399251, col 4, lines 1-15). Hence, since Honbo et al also teaches the criticality of the negative electrode density to the capacity of the power source, the unexpected properties of the claimed invention are not shown to have a significance equal to or greater than expected properties, and therefore, the evidence of unexpected properties is not sufficient to rebut the evidence of obviousness. Accordingly, although evidence has been presented in applicants' specification showing that particular negative electrode densities are effective, it has been concluded that these beneficial results would have been expected because one of the references (Honbo et al'251) is teaching that the specific negative electrode density is very efficient and provides better capacity results compared with other negative electrode densities.

Furthermore, the objective evidence of nonobviousness is not commensurate in scope with the instant claims which the evidence is offered to support. For instance, it is noted that data of Figure 1 showing improved capacity and cycle reduction characteristics does not evidence unexpected results for the entire claimed range of 0.6-1.2 g/cc or 0.7-1.0 g/cc because as apparent from Figure 1 below, significant initial capacity of more than 1.2 mAh is reached at negative electrode densities greater than about 0.8-0.85 g/cc (not 0.6 g/cc or 0.7 g/cc as instantly claimed) and significant reduction in capacity of more than 7 % (assuming that 7 % is an

acceptable reduction) are observed at negative electrode densities as low as about 0.9 – 0.95 g/cc or higher (not 1.0 g/cc or 1.2 g/cc as instantly claimed). For that reason, it is contended that the objective evidence of nonobviousness is not commensurate in scope with the present claims.

FIG. 1



Likewise, it is also unclear whether or not the synergistic effect of having or not having combined (as instantly claimed) the specific binder materials, conducting agent materials, or current collectors materials, electrolytes and their specific molar amount and composition as exemplified in EXAMPLES 1-7 will definitely improve or deteriorate such capacity characteristics. However, even assuming that the synergistic effect of the foregoing specific components and their molar amounts/compositions are neglectable (or constants as argued), it is constructively asserted that the expected results are not commensurate in scope with the claimed

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invention as it has not been possible to ascertain a trend in the exemplified data that would allow the skilled artisan to reasonably extend the probative value thereof.

In response to applicant's argument that "Honbo et al is an example of a lithium ion secondary cell....which operates according to a different mechanism" and that "Honbo et al is irrelevant", the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). In this regard, it is noted that Honbo et al teach a negative electrode active material characterized in containing carbon, and having a density in the range larger than 0.95 g/cc, and smaller than 1.5 g/cc. Thus, Honbo et al's teaching does clearly encompass the use of the negative electrode materials made of carbon and having the claimed density range regardless of the chemical environment of the battery. Hence, Honbo et al directly teaches the use of carbon negative active material within the specified density magnitude. It is the position of the examiner that the cited reference is in the field of applicant's endeavor or, at least, it is reasonably pertinent to the particular problem with which the inventor is concerned. In this case, the disclosures of both references are found to be within the same field of endeavor and, thus, relevant and pertinent to each other because the battery environment disclosed in both references is fairly comparable, namely, both reference are directed to batteries or electrochemical cells having organic electrolyte systems and address the same problem of providing working battery components such as the negative electrode suitable for incorporation into batteries or electrochemical cell embodiments. Furthermore, the examiner wishes to point out that the electrode of the prior art performs exactly the identical function specified in the instant claim in

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substantially the same way, and produces the substantially the same results as the claimed electrode of the present invention. Consequently, a person of ordinary skill in the art would have recognized the interchangeability of the element (i.e. the negative electrode) shown in the prior art for the corresponding element claimed in the instant invention. Again, since there are insubstantial differences between the negative electrode of the prior art and the claimed negative electrode, and the Honbo et al reference does not provide any indication that its negative electrode is specially restricted to any particular battery environment as argued and speculated by the applicants, the burden is shifted to the applicant to provide objective evidence demonstrating that Honbo's negative electrode when used as applied in the battery of Kuruma et al will indeed cause detrimental effects thereto. That is to say, the burden is shifted to the applicants to supply, provide or present objective evidence showing why Honbo et al's negative electrode cannot function in a substantially similar battery environment.

5) moreover, the Applicants have argued the following from page 9, line 11 to page 9, line 20 of the Appeal Brief:

*"Regarding the Examiner's criticism of the comparative data of record, Appellants respectfully submit that there is no prima facie case of obviousness, so that any criticisms are moot. Nevertheless, even if there was such a prima facie case, it is respectfully submitted that the Examiner is being overly strict. The Examiner has offered no reasons why one skilled in the art would have expected different conclusions using, for example, as constants, different binder materials, conducting agent materials, current collector materials, electrolytes, and the like. Indeed, in each of Examples 1 to 4, 6 and 7, the only variable was the negative electrode density. The Examiner has not explained why one skilled in the art would not accept the evidence of record as demonstrating the significance of the negative electrode density."*



In this respect, the examiner has contended that is also unclear whether or not the synergistic effect of having or not having combined (as instantly claimed) the specific binder materials, conducting agent materials, or current collectors materials, electrolytes and their specific molar amount and composition as exemplified in EXAMPLES 1-7 will definitely improve or deteriorate such capacity characteristics. However, even assuming that the synergistic effect of the foregoing specific components and their molar amounts/compositions are neglectable (or constants as argued), it is constructively asserted that the expected results are not commensurate in scope with the claimed invention as it has not been possible to ascertain a trend in the exemplified data that would allow the skilled artisan to reasonably extend the probative value thereof.

6) furthermore, the Applicants have argued the following from page 9, line 21 to page 10, line 7 of the Appeal Brief:

*“As further evidence that Honbo et al does not present a prima facie case of obviousness, the comparative data of Honbo et al demonstrates that for purposes of Honbo et al's invention, a negative electrode density within a particular range, while necessary, is not sufficient. Honbo et al require that a number of variables therein be satisfied, such as half value of the peak (400), average primary particle diameter, specific surface area of secondary particles, lattice constant of active material, in addition to negative electrode density. Indeed, Honbo et al's Comparative Examples 1, 3 and 4 show that even when the density is within Honbo et al's range, their battery is deficient because all the other variables are not satisfied. Interestingly, the battery of Honbo et al's Comparative Example 2 is deficient when the density is  $0.91 \text{ g/cm}^3$ , which density is outside Honbo et al's range but well within Appellants' range.”*

All over again, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). In this regard, it is noted that Honbo et al teach a negative electrode active material characterized in containing carbon, and having a density in the range larger than 0.95 g/cc, and smaller than 1.5 g/cc. Thus, Honbo et al's teaching does clearly encompass the use of the negative electrode materials made of carbon and having the claimed density range regardless of the chemical environment of the battery. Hence, Honbo et al directly teaches the use of carbon negative active material within the specified density magnitude. In this manner, the examiner impartially upholds and remarks that the cited reference is in the field of applicant's endeavor or, at least, it is reasonably pertinent to the particular problem with which the inventor is concerned. Additionally, applicants' arguments are not well taken because it is noted that the features upon which applicant relies (i.e., "the half value of the peak (400)", "the average primary particle diameter", "the specific surface area of secondary particles", "the lattice constant of active material") are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read, if they happen to be disclosed, into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Accordingly, if applicants insist that the foregoing variables essentially characterize the negative electrode of Honbo et al, and thus, they are deemed to be extremely significant and important so as to affect the chemical behavior of the disclosed negative electrode, that very statement gives the examiner a reasonable basis to suspect that applicants' negative electrode must also be defined in term of the foregoing variables, in addition to negative

electrode density. Since the present claims are completely silent with respect to the aforementioned variables, it is contended that applicants, in effect, does not consider them essentially significant and important. Nor applicants have included a positive statement as to how the foregoing variables (i.e., "the half value of the peak (400)", "the average primary particle diameter", "the specific surface area of secondary particles", "the lattice constant of active material") affect the behavior of their negative electrode, to be precise, the currently claimed negative electrode not the disclosed negative electrode (prior art electrode).

7) in addition, the Applicants have argued the following from page 10, line 8 to page 11, line 4 of the Appeal Brief:

*"The remainder of this Appeal Brief is directed to the Examiner's Response to Arguments in the Advisory Action, entered February 17, 2004.*

*Regarding Appellants' argument that it is they who discovered that the negative electrode density is a result-effective variable, the Examiner appears to fail to appreciate both Appellants' point and the legal ramifications flowing therefrom. Indeed, the Examiner completely misconstrues Appellants' argument by stating that Appellants "basically (agrees with the fact the negative electrode density should not be considered a result-effective variable at all" (page 2). The Examiner then incorrect concludes that "since (Appellants) share the same opinion that the prior art failed to recognize the negative electrode density as a result-effective variable, it is therefore noted that the negative electrode density does not impart criticality in the secondary power source and, hence it is not supportive of patentable subject matter" (id.).*

*While the Examiner cites MPEP 2144.05, he ignores applicable precedent therein, such as In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (exceptions to rule that optimization of a result-effective variable is obvious, such as where the results of optimizing the variable are unexpectedly good or where the variable was not recognized to be result*

*effective). Appellants are entitled to prevail under either of the above exceptions.*

*While this section of the MPEP also describes case precedent regarding optimization of ranges, note that the applied prior art discloses no range for a negative electrode density for a secondary power source of the type claimed herein, i.e., the type disclosed in Kuruma et al and the claims of the Tsushima et al patents.”*

In this regard, the examiner's position has been clearly set forth in detail above with respect to applicant's argument that the density of the negative electrode is a result-effective variable including the specific appellants' point and legal ramification. Nevertheless, for the convenience of the applicants the examiner is willing to repeat it again. In addition, the examiner does not agree with the argument that appellants' arguments have been misconstrued for the reasons stated hereinabove and repeated hereinafter.

In this respect, the examiner likes to contend that as set forth in MPEP 2144.05 Obviousness of Ranges, II. Optimization of Ranges, B. Only Result-Effective Variables Can Be Optimized: a particular parameter must first be recognized as a result-effective variable in the prior art, i.e. a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. In this case, applicant's argument basically agrees with the fact the negative electrode density should not be considered a result-effective variable at all. For example, applicants argued that: a) “in effect, applicants discovered that the density of the negative electrode is a result-effective variable that affects both the initial capacity and the change in capacity” (see page 3, lines 5-7 of the Request for Reconsideration After Final); b) “as described above, none of the other applied references describe the density of the negative electrode material, and therefore fail to recognize that the negative electrode density is result-effective in a secondary power source” (see page 5, lines 13-18 of the Request for Reconsideration After Final). Thus, since applicants share the

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same opinion that the prior art failed to recognize the negative electrode density is a result-effective variable, it is therefore noted that the negative electrode density does not impart criticality in the secondary power source and, hence it is not supportive of patentable subject matter.

8) the Applicants have further argued the following from page 11, line 5 to page 11, line 17 of the Appeal Brief:

*“Regarding the Examiner's finding that the disclosures of "both" [sic, all] references are directed to batteries or electrochemical cells having organic electrolyte systems and that, in effect, the negative electrode of Honbo et al "performs exactly the identical function" as in the present claims and the prior art of Kuruma et al, and the claims of the Tsushima et al patents (page 3), Appellants respectfully submit that in the context of the present invention, Honbo et al is from a different field of endeavor from Kuruma et al and the claims of the Tsushima et al patents, because a secondary power source having an activated carbon positive electrode material is from a different field of endeavor from a lithium ion secondary cell having a positive electrode composed mainly of a lithium-containing transition metal oxide since, as discussed above, the mechanism of the charge and discharge differs from each type of source. It is worth noting that the Examiner never addresses this argument, because there is no rejoinder.”*

Again, the examiner's position has been clearly set forth in detail hereinabove with respect to the argument that “Honbo et al is from a different field of endeavor from Kuruma et al and the claims of Tsushima et al patent” .

In this case, the disclosures of the references are found to be within the same field of endeavor and, thus, relevant and pertinent to each other because the battery environment disclosed in both references is fairly comparable, namely, both reference are directed to batteries

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or electrochemical cells having organic electrolyte systems and address the same problem of providing working battery components such as the negative electrode suitable for incorporation into batteries or electrochemical cell embodiments. Furthermore, the examiner wishes to point out that the electrode of the prior art performs exactly the identical function specified in the instant claim in substantially the same way, and produces the substantially the same results as the claimed electrode of the present invention. Consequently, a person of ordinary skill in the art would have recognized the interchangeability of the element (i.e. the negative electrode) shown in the prior art for the corresponding element claimed in the instant invention. Again, since there are insubstantial differences between the negative electrode of the prior art and the claimed negative electrode, and the prior art reference does not provide any indication that its negative electrode is specially restricted to any particular battery environment as argued and speculated by the applicants, the burden is shifted to the applicant to provide objective evidence demonstrating that Honbo et al negative electrode when used as applied in the battery of Kuruma et al and or Tsushima et al will indeed cause detrimental effects thereto. That is to say, the burden is shifted to the applicants to supply, provide or present objective evidence showing why Honbo et al's negative electrode cannot function in a substantially similar battery environment.

In addition, it is noted that applicants have failed to describe or point out why or how the specific mechanism of each battery does not allow to combine together the applied primary references with the secondary reference. In that, it is noted that utterly arguing that the references are not combinable because the mechanism of the charge and discharge differs from each type of source, clearly reflects a complete misunderstanding of the battery art and its relative chemical environments which allow adequate interchangeability and compatibility of battery components.

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Thus, Regarding applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the disclosures of both references are found to be within the same field of endeavor and, thus, relevant to each other because the battery environment disclosed in both references is fairly comparable, namely, both reference are directed to batteries or electrochemical cells having organic electrolyte systems. Furthermore, the examiner wishes to point out that the electrode of the prior art performs exactly the identical function specified in the instant claim in substantially the same way, and produces the substantially the same results as the claimed electrode of the present invention. Consequently, a person of ordinary skill in the art would have recognized the interchangeability of the element (i.e. the negative electrode) shown in the prior art for the corresponding element claimed in the instant invention. Since there are insubstantial differences between the negative electrode of the prior art and the claimed negative electrode, the burden is shifted to the applicant to provide objective evidence demonstrating that Honbo's negative electrode when used as applied in the battery of Kuruma et al will indeed cause detrimental effects thereto.

9) the Applicants have additionally argued the following from page 11, line 17 to page 12, line 5 of the Appeal Brief:

*“Regarding the Examiner's findings that any showing of superior results have not been shown to be unexpected, and if unexpected, not commensurate in scope with the claims, and if shown to be unexpected, not shown to have a significance equal to or greater than expected properties (pages 3-5), these findings have been addressed above. Thus, no prima facie case of obviousness has been made out; therefore, Appellants were under no burden to show unexpected results. Nevertheless, they have shown unexpected results with regard to the presently-recited range of the negative electrode density.”*

*Regarding the Examiner's analysis of the data as shown in above-discussed Figure 1 (pages 5-6), the fact that better results might be obtained in a narrower range within the broader ranges of 0.6 to 1.2, or 0.7 to 1.0, g/cm<sup>3</sup> does not detract from the fact that it has been shown that these broader ranges provide results unexpectedly better than outside these ranges.”*

All over again, the examiner's position has been visibly set forth in detail above with respect to the showing of superior results.

As far as criticality of the claimed density range and/or the superior performance characteristics of the secondary power sources presented in Table 1 (Examples 1-7), the examiner likes to contend that such results and, thus, the specific power sources as prepared in EXAMPLES 1-7 are not commensurate to the specific secondary power source as claimed in claims 1-16. In this respect, it is emphasized that the instant (claimed) secondary power source lacks significant, essential, vital and/or crucial features, for instance, the specific binder material, the specific conducting agent material, the specific current collector and its material, the specific electrolyte comprising both the salt and the solvent and the specific mass ratio of every single power source component as presented in EXAMPLES 1-7. Thus, the foregoing performance characteristics of the exemplified secondary power sources does not reflect or correspond to the performance characteristic of the claimed power source. In this regard, it is further contended



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that the submission of objective evidence of patentability does not automatically mandate a conclusion of patentability in and of itself. Although the record may establish evidence of secondary considerations which might be indicia of nonobviousness, the actual record establishes such a strong case of obviousness that the objective evidence of nonobviousness is not sufficient to outweigh the evidence of obviousness. Accordingly, a prima facie case of obviousness cannot be simply rebutted by merely recognizing additional advantages or latent properties present in the prior art. Moreover, applicants must further show that the results were greater than those which would have been expected from the prior art to an unobvious extent, and that the results are of a significant and practical advantage. For example, it is noted that applicants have fairly argued that the specific negative electrode density somehow affects the capacity (its initial capacity and cycle capacity) of the power source (see page 5, last full paragraph and page 6, bridging paragraph and Figure 1 of the Request for Reconsideration After Final). However, it is further noted that Honbo et al clearly teach that if the negative electrode density is smaller than 0.95 g/cc, vacancies in the negative electrode are numerous and the specific surface area of the electrode is large, accordingly, a large amount of positive active material is precipitated on and inside the negative electrode and thus, the precipitated material decreases the capacity of the negative electrode significantly, and makes the cycle life short. On the other hand, if the negative electrode density is larger than 1.5 g/cc, the vacancies is too small to make electrolyte penetrate into the inside of the electrode, and therefore, the capacity of the negative electrode is decreased significantly, and the objective secondary lithium battery can not be obtained (Honbo et al US 6399251, col 4, lines 1-15). Hence, since Honbo et al also teaches the criticality of the negative electrode density to the capacity of the power source, the unexpected properties of the claimed

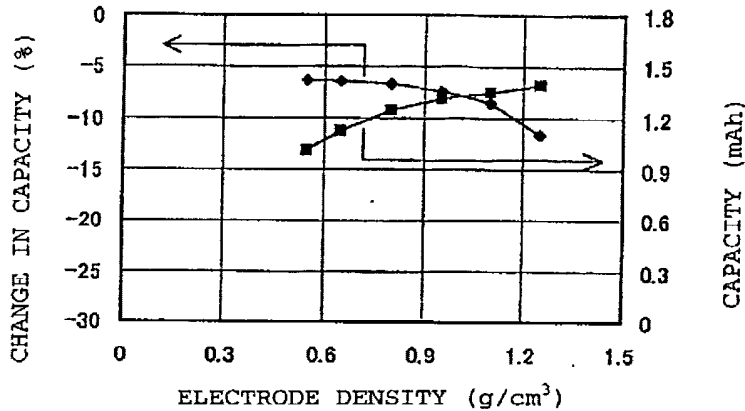
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invention are not shown to have a significance equal to or greater than expected properties, and therefore, the evidence of unexpected properties is not sufficient to rebut the evidence of obviousness. Accordingly, although evidence has been presented in applicants' specification showing that particular negative electrode densities are effective, it has been concluded that these beneficial results would have been expected because one of the references (Honbo et al'251) is teaching that the specific negative electrode density is very efficient and provides better capacity results compared with other negative electrode densities.

Furthermore, the objective evidence of nonobviousness is not commensurate in scope with the instant claims which the evidence is offered to support. For instance, it is noted that data of Figure 1 showing improved capacity and cycle reduction characteristics does not evidence of Figure 1 showing improved capacity and cycle reduction characteristics does not evidence unexpected results for the entire claimed range of 0.6-1.2 g/cc or 0.7-1.0 g/cc because as apparent from Figure 1 below, significant initial capacity of more than 1.2 mAh is reached at negative electrode densities greater than about 0.8-0.85 g/cc (not 0.6 g/cc or 0.7 g/cc as instantly claimed) and significant reduction in capacity of more than 7 % (assuming that 7 % is an acceptable reduction) are observed at negative electrode densities as low as about 0.9 – 0.95 g/cc or higher (not 1.0 g/cc or 1.2 g/cc as instantly claimed). For that reason, it is contended that the objective evidence of nonobviousness is not commensurate in scope with the present claims.

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FIG. 1



Likewise, it is also unclear whether or not the synergistic effect of having or not having combined (as instantly claimed) the specific binder materials, conducting agent materials, or current collectors materials, electrolytes and their specific molar amount and composition as exemplified in EXAMPLES 1-7 will definitely improve or deteriorate such capacity characteristics. However, even assuming that the synergistic effect of the foregoing specific components and their molar amounts/compositions are neglectable (or constants as argued), it is constructively asserted that the expected results are not commensurate in scope with the claimed invention as it has not been possible to ascertain a trend in the exemplified data that would allow the skilled artisan to reasonably extend the probative value thereof.

10) the Applicants have also argued the following from page 12, line 6 to page 12, line 11 of the Appeal Brief:

*“The Examiner continues to rely on Obiaya, supra with regard to the above-discussed argument about Honbo et al's particular positive electrode material and the purpose of the density limitation of Honbo et al's negative electrode material (pages 6-7). But this argument*

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*is not a recognition of another advantage which would flow naturally from following the suggestions of the prior art. Rather, this argument is simply that one skilled in the art would not combine the prior art as the Examiner has."*

Yet again, the examiner's position has been evidently set forth in detail above with respect to Obiaya and the implication of another advantage flowing from following the suggestion of the prior art.

The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985). In this regard, it is noted that Honbo et al teach a negative electrode active material characterized in containing carbon, and having a density in the range larger than 0.95 g/cc, and smaller than 1.5 g/cc. Thus, Honbo et al's teaching does clearly encompass the use of the negative electrode materials made of carbon and having the claimed density range regardless of the chemical environment of the battery. Hence, Honbo et al directly teaches the use of carbon negative active material within the specified density magnitude. In this manner, the examiner impartially upholds and remarks that the cited reference is in the field of applicant's endeavor or, at least, it is reasonably pertinent to the particular problem with which the inventor is concerned. Therefore, regarding applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir.

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1992). In this case, the disclosures of both references are found to be within the same field of endeavor and, thus, relevant to each other because the battery environment disclosed in both references is fairly comparable, namely, both reference are directed to batteries or electrochemical cells having organic electrolyte systems. Furthermore, the examiner wishes to point out that the electrode of the prior art performs exactly the identical function specified in the instant claim in substantially the same way, and produces the substantially the same results as the claimed electrode of the present invention. Consequently, a person of ordinary skill in the art would have recognized the interchangeability of the element (i.e. the negative electrode) shown in the prior art for the corresponding element claimed in the instant invention. Since there are insubstantial differences between the negative electrode of the prior art and the claimed negative electrode, the burden is shifted to the applicant to provide objective evidence demonstrating that Honbo's negative electrode when used as applied in the battery of Kuruma et al will indeed cause detrimental effects thereto.

11) finally, the Applicants have argued the following from page 12, line 12 to page 12, line 14 of the Appeal Brief:

*"Finally, with regard to the Examiner's discussion of the double patenting rejections (pages 7-8), his point is not understood. Claims 11 and 12 do not contain "consisting essentially of" language."*

Concerning the double patenting rejection for claims 11-12, it is noted that claims 1-2, 7 and 11-12 were originally rejected under the judicially created doctrine of obviousness-type double patenting. However, the double patenting rejection for claims 1-2 and 7 was overcome because applicants amended the claims to recite the excluding legal language "consisting

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essentially” along with specific positive and negative electrode constituents and their contents. In contrast, claims 11-12 were not amended to recite specific constituents of the positive and negative electrodes and their contents as well as the excluding legal language “consisting essentially”, and therefore, in the examiner’s opinion, the double patenting rejection still reads on the claims 11-12 as the patent claims do not distinguish from the present claims based on the obviousness-type double patenting rejections set forth and presented in prior art office actions and in this Examiner’s Answer.

For the above reasons, it is believed that the rejections should be sustained.


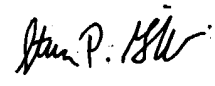
Respectfully submitted,

Raymond Alejandro  
Examiner  
Art Unit 1745



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